

Schistosome Dermatitis in Pennsylvania

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SCHISTOSOME DERMATITIS was first observed in the United States in 1928 among persons who had been wading in the waters of Douglas Lake in Michigan (1). The cercariae of approximately 20 species of nonhuman schistosomes are known to penetrate the skin of man and cause a dermatitis known as swimmer's itch. Schistosome dermatitis is widely distributed throughout the freshwater areas of the Americas. It is highly endemic in Canada, Michigan, Wisconsin, and Minnesota. The disease is not restricted to freshwater areas, however. Cases of marine schistosome dermatitis have been reported from the Atlantic and Pacific seaboards and the Gulf Coast (2).

The natural hosts of nonhuman schistosomes are usually waterfowl or nonprimate mammals, and the

intermediate hosts are snails. Schistosome eggs in fecal matter from infected hosts hatch in water and produce miracidia, which enter suitable snails. The snails then produce larval forms, known as sporocysts, that subsequently produce fork-tailed schistosome cercariae. When released into water, the cercariae may again infect natural hosts or penetrate human skin.

Occurrence in Pennsylvania

On June 20, 1974, a local farmer asked the Pennsylvania Department of Environmental Resources about the control of snails in his pond because his children and their friends had been swimming in it since May and had developed red spots and itching sensations over their entire bodies. The children had seen their school nurse, and she suggested that they probably had swimmer's itch. Since this condition had not been recognized previously in the State, the farmer was referred to the department's Medical Entomology Laboratory. Personnel from the laboratory visited the pond site on July 21.

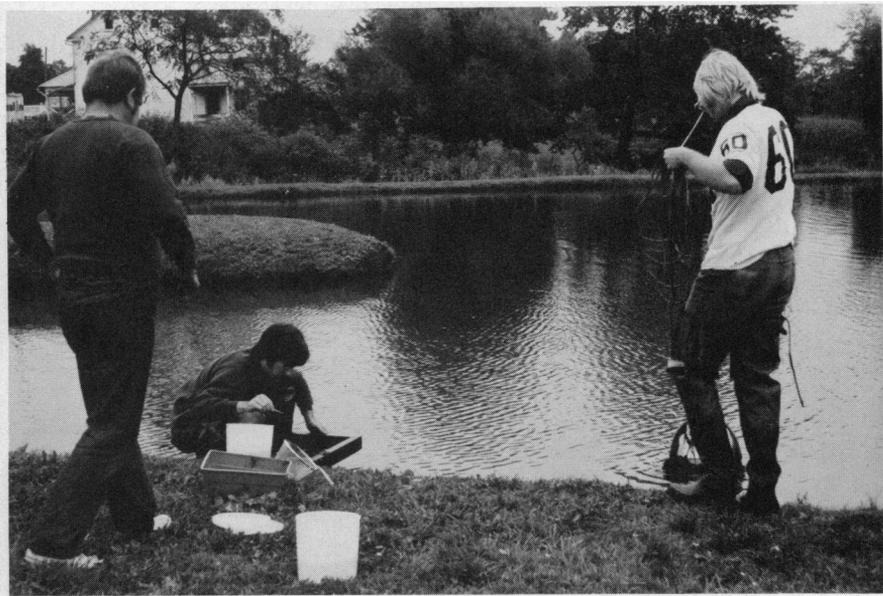
The 1-acre pond is on a sloping terrain, and it ranges in depth from about 1 foot on the uphill side to approximately 14 feet on the lower edge. When the pond was constructed in 1972, a small earthen

dam was built on the lower edge. Water is fed into the pond by underground springs and runoff from surrounding fields. Vegetation and algae are abundant on the shallow, muddy-bottom side. Five species of duck and geese reside at the pond, and migratory waterfowl, such as mallards, visit it frequently and are fed by the farmer.

Snails were collected from the pond on July 8 and July 23. A dragnet with a 30-foot drag line was thrown into the pond from various sides to collect large amounts of bottom material. The material was washed through a 1/8-inch screen in the pond, and the snails were picked off with forceps and placed in gallon jugs of water. The snails were then sent to the laboratory in Harrisburg. Some snails from the July 8 collection were fixed in alcohol-formalin-acetic acid and forwarded to one of us (Fried). The presence of avian schistosome larvae was confirmed in some of the fixed snails. The larvae were tentatively identified as belonging to the genus *Trichobilharzia*. The snails collected on July 23 were tentatively identified as belonging to the genus *Physa*; specimens sent to William Clench at the Museum of Comparative Zoology, Harvard University, were subsequently identified as *Physa heterostropha* (Say).

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Approximately 200 *P. heterostropha* snails were delivered to Fried on July 23. All the snails were alive and active. They were placed in a 5-gallon aerated aquarium containing boiled, filtered pond water and fed boiled lettuce at unscheduled times. On July 25, 25 snails ranging in size from 4 to 8 mm were randomly selected and dissected individually in a small amount of pond water; 6 were found to be infected with echinostome rediae and cercariae. Most of the 25 snails were infected with echinostome cysts, a ciliate protozoan, *Trichodina* sp., and an oligochaete, *Chaetogaster limnaei*. Subsequent infectivity studies in which cysts were fed to domestic chicks revealed that the echinostome was *Echinoparyphium flexum*. None of the aforementioned parasites has public health significance in the United States. Two of the 25 snails were infected with sporocysts and cercariae of the avian schistosome *Trichobilharzia* sp., and 1 of these snails was also infected with immature rediae of *E. flexum*. Parasites of the genus *Trichobilharzia* are of public health significance in the United States as causative agents of schistosome dermatitis in man.

To obtain information on cercarial emission from snails, we

selected 100 *Physa* at random on July 25 and isolated them individually in 6 mm Petri dishes containing about 5 ml of pond water per dish. Microscopic examinations made periodically during the next 2 days revealed that 33 snails were positive for *E. flexum*, based on cercarial emission. Another snail emitted *Trichobilharzia* sp. cercariae and was found to be positive by isolation procedures. This snail was placed in a finger bowl culture and fed lettuce. It survived in the laboratory for about 1 month. During that time, the snail shed thousands of schistosome cercariae, which were used in studies on the morphology, behavior, and histochemistry of *Trichobilharzia* sp. (The results of these studies will be reported elsewhere.) The remaining 66 snails were found to be negative by isolation procedures, and they were subsequently dissected individually. Dissection revealed *Trichobilharzia* larvae in one snail. Thus, of the 125 *P. heterostropha* snails from the July 23 collection—examined by dissection and isolation procedures—4 or 3.2 percent were infected with the avian schistosome *Trichobilharzia* sp.

Reports of observations of *Trichobilharzia* from *Physa* snails in North America indicate that the

species is *T. physellae* (3-5). Talbot (6) described the cercariae of *T. physellae* from physid snails in Michigan. The cercariae we studied showed slight morphologic and considerable behavioral differences from those described by Talbot. Studies are in progress to determine if the species we found is referable to any of those described as belonging to the genus *Trichobilharzia* or if it should be described as a new species.

Conclusion

Although the cercariae of the avian schistosome *Trichobilharzia* sp. produce only dermatitis in man, discomfort and severe irritation may debilitate the infected person for several days. The dermatitis is a result of an allergic reaction to the presence of cercariae in the skin. Lesions, unless secondarily infected, usually disappear within 7 to 10 days. Public health workers should be aware of this condition and take appropriate measures to warn people to keep out of infected water or, if necessary, to control infected snail populations by use of molluscicides in accordance with the environmental laws of their States.

References

1. Cort, W. W.: Schistosome dermatitis in the United States (Michigan). *JAMA* 90: 1027-1029 (1928).
2. Cort, W. W.: Studies on schistosome dermatitis. XI. Status of knowledge after more than twenty years. *Am J Hyg* 52: 251-307 (1950).
3. Holla, W. A., and Lane, E. A.: Report of an itching dermatitis apparently due to schistosome cercariae. *NY State J Med* 47: 2458 (1947).
4. Stauber, L. A.: Swimmer's itch. *Public Health News* (NJ State Department of Health) 38: 366-367 (1957).
5. Hunter, G. W., III: Studies on schistosomiasis. XIII. Schistosome dermatitis in Colorado. *J Parasitol* 46: 231-234 (1960).
6. Talbot, S. B.: Studies on schistosome dermatitis-producing schistosome cercariae, *C. elvae* Miller, 1923, *C. stagnicolae* N. sp., and *C. physellae* N. sp. *Am J Hyg* 23: 372-384 (1936).